

Neuropathies Conditions		Neuropathies testing (cont)		tendon repairs (cont)		Splints (cont)	
ulnar claw	ulnar nerve (hyperextension of 4/5th digits)	ulnar nerve testing motor innervation of thumb	positive froments test - flexion of IP joint of thumb	- 8-12 weeks	strengthening, work, leisure	carpal tunnel syndrome	wrist splint positioned in neutral - decrease carpal canal pressure
hand of benediction	high median nerve - only occurs when attempt to make a fist	Finger issues		- 0-4.5 weeks	dorsal blocking splint, exercises in splint include flexion of PIP joint, DIP joint	cubital tunnel syndrome	elbow splint position at 30 degrees of flexion - prevent elbow flexion at night
ape hand	median nerve - injured hand at rest - thumb adducted, cannot abduct/oppose thumb	trigger finger	A1 pulley	- 4.5-6 weeks	active flexion and extension within limits of splint	de quervains	thumb splint, includes wrist, IP joints free
wrist drop	ulnar nerve issue	swan neck deformity	proximal interphalangeal (PIP) joint hyperextension and the distal interphalangeal (DIP) joint flexion	- 6-8 weeks	tendon glides, differential tendon gliding, scar management	skiers thumb	UCL hand based thumb splint - protect the ulnar collateral ligament of MCP
carpal tunnel	median nerve compression at wrist	boutonniere deformity	flexed at the proximal interphalangeal joint (PIP) and hyperextended at the distal interphalangeal joint (DIP)	- 8-12 weeks	strengthening/work activities	CMC arthritis	hand based thumb splint - for hand to be at rest to decrease inflammation
cubital tunnel	ulnar nerve compression at elbow	ulnar drift	fingers shift towards ulnar side - RA	Splints		ulnar drift	ulnar wrist/deviation splint - decrease pain, provide stability, realign MCP
ulnar tunnel - handle palsy	ulnar nerve compression at guyons canal	tendon repairs		brachial plexus injury	flail arm splint - for positioning	flexor tendon injury	dorsal protection splint - for protection of site
radial tunnel	radial tunnel compression	kleinert	passive flexion using rubber band traction and active extension to the hood of the splint	radial nerve injury	colditz or radial nerve splint -for function		
Neuropathies testing		- 0-4 weeks	dorsal block splint early phase	medial nerve injury	opponens splint (for functional activities), Cbar, thumb post		
carpal tunnel testing	tinels and phalens - prayer/reverse prayer sign	- 4-7 weeks	continue dorsal block splint, but adjust wrist to neutral	ulnar nerve injury	anticlaw splint, lumbrical bar splint - prevent clawing		
cubital tunnel testing	tinels	- 6-8 weeks	no splint, AROM, light OT activities	spinal cord - C6-C7	tenodesis splint - facilitate grasp and release		
de quervains	positive finkelstein "hook grip"						
semmes wienstein - sensory	occlude pts eye; touch different areas of hand						
guyons canal syndrome testing	testing over guyons canal						

Splints (cont)		Range of motion		muscle strength testing and interventions (cont)		muscle strength testing and interventions (cont)	
swan neck	silver rings, button-hole/hyperextension block splint - prevent further deformity	goniometer	measurement tool	4 good	Complete ROM against gravity and moderate resistance. Resistive exercise is used to increase strength. Example: Tossing a beach ball with weighted cuffs strapped to the patient's wrists. Tossing a therapy ball.	3- / fair minus	More than 50% ROM against gravity. Example: Structure an activity to encourage the patient to lift his arm up in a vertical plane, against gravity. As the patient will not be able to achieve a complete ROM, place the goal at the highest level which the patient is able to reach.
boutonniere deformity	silver ring or PIP extension	functional ROM	rom needed to perform functional movements - reaching to top of head, small of back	3+ fair plus	Complete ROM against gravity and slight resistance. Resistive exercise is used to increase strength. Example: Tossing a beach ball.	2+ poor plus	Less than 50% ROM against gravity / complete ROM gravity eliminated slight resistance. Example: Place the patient's arm on top of a table. Structure a table top activity which requires the patient to slide their arm along the surface of the table, through a complete ROM (in a gravity eliminated plane). Using a regular surface and introducing weighted game pieces, will add resistance to the movement.
arthritis	functional splint or safe splint - decrease inflammation	active ROM - AROM	contractile structures - movement produced by ones own muscle	3 fair	Complete ROM against gravity. When a grade of 3 is reached, the activity can be structured to move against gravity. Example: Balloon volleyball / throwing a balloon at a target, which requires the patient to lift their arm up against gravity. Adapted volleyball type game.		
flaccidity	resting/functional hand splint - prevent joint contracture, common wearing and at night then on off during the day	passive ROM - PROM	noncontractile structures - movement produced by an external force				
spasticity	spasticity splint or cone splint - prevent joint contracture	active assisted range of motion - AAROM	movement produced by ones own muscles and assisted by an external force				
muscle weakness - ALS, SCI, guillain barre	balanced forearm orthosis (BFO), deltoid sling/suspension sling - supports	muscle strength testing and interventions					
hand burns	wrist 15-30 degrees extension, MCP 50-70 degrees flexion, IPs in full extension	MMT	break test is most common				
		5 normal	Complete ROM against gravity and maximal resistance. Resistive exercise is used to increase strength. Example: Tossing a medicine ball while standing.				

muscle strength testing and interventions (cont)

2 Complete ROM with gravity eliminated. For exercises/activities performed in a gravity-reduced plane, use a powdered surface or skateboard to reduce the resistance produced by friction on a supporting surface. Example: Place the patient's arm on top of a table which has been covered with powder. Structure a table top activity which requires the patient to slide their arm along the surface of the table, through a complete ROM (in a gravity eliminated plane). Play a board game with light game pieces, or table cricket.

muscle strength testing and interventions (cont)

2- / Incomplete ROM with gravity eliminated. Patient moves the joint through partial ROM and the therapist or mechanical device completes the ROM. Example: Support the patient's arm and allow the patient to actively move through as much range as is possible, in a gravity eliminated plane. As soon as the therapist feels/observes that the patient has stopped actively moving, the therapist continues to support and move the patient's arm through the complete ROM. Incorporate a goal into the exercise e.g. incorporate using a suspension mobile arm support with a meaningful activity.

muscle strength testing and interventions (cont)

1 No movement but can contract muscle. Facilitate muscle contraction – Tap, rub, vibrate muscle to facilitate a stronger contraction. Active-Assisted Exercise. The patient contracts their muscle, and the therapist or a mechanical device completes the entire ROM. Slings, pulleys, weights, springs, or elastic bands may be used to provide mechanical assistance. This exercise is graded by decreasing the amount of assistance until the patient can perform active exercises. Example: Supporting and moving the patient's arm through a full ROM in a gravity eliminated plane. Incorporate a goal into the exercise e.g. support the patient's arm on a large ball and assist the patient in rolling the ball through a full ROM, to play a variation of traditional ten-pin bowling.

muscle strength testing and interventions (cont)

0 No muscle contraction. Paralysis. Maintain PROM. The purpose of passive exercise is to prevent contractures, adhesions, and deformity by maintaining ROM.

simple interventions

increasing strength high resistance, low reps

increasing endurance increase reps, low weight/resistance

edema reduction elevation, retrograde massage, compression, contrast baths

scar mgt ROM, massage, compression, scar pad with compression, splinting, edema control

sensory training - desensitization for hypersensitivity massage, textures, vibration, fluidotherapy

sensory training - re-education massage, textures, vibration, fluidotherapy *high risk for injury since they are not feeling

joint protection use hips/knees, push large items with full body, carry bags on forearm

simple interventions (cont)			PAMS (cont)			PAMS (cont)			PAMS (cont)			
body mechanics			do not move items that are too heavy, keep objects close to the body during lifting, hold object centered at waist level	cold pack	pain management, anti inflammation, edema control, decrease of muscle guarding, spasm.	Hypersensitivity or poor tolerance to cold • Raynaud's disease and phenomenon • Circulatory impairment – e.g. hemorrhaging tissue or untreated hemorrhagic disorders • Peripheral vascular disease • Active DVT • Impaired sensation (neuropathy) • Open wounds, near chronic wounds • Cryoglobulinemia* • Over regenerating nerves • Impaired cognition and/or ability to communicate	hot pack	subacute and chronic conditions. Relieves pain, increases soft tissue extensibility, reduces muscle spasm, relaxes skeletal muscles, decreases joint stiffness, and promotes wound healing.	Peripheral vascular disease • Impaired circulation, bleeding disorder, DVT or thrombophlebitis • Local malignancy and recently radiated areas • Acute inflammation or trauma, edema, infection • Open wounds • Over large scars • Impaired sensation (neuropathy) • Large areas, or at sufficient intensity to raise core temperature-pregnancy, severe cardiac disease/in cardiac failure • Impaired ability to communicate-cognition or communication impairments	fluidotherapy - heat	help patients with their hands and wrists. Arthritis, chronic tendonitis, postoperative conditions, post fracture management, and Raynaud's syndrome.	open wounds
PAMS												
pam	indication	precautions/-contraindication								neuromuscular electrical stimulation NMES - muscle stimulation	stimulate paralyzed, paretic muscle weakness, peripheral neuropathy, and muscle spasm.	Pregnancy • Cancer • Presence of a cardiac pacemaker or any other electrical stimulators Precautions include obesity, impaired sensation and over relatively superficial metal implants.

sufficient to
prevent
patient
from giving
accurate
and timely
feedback •
Areas
affected by
heat-sens-
itive skin
diseases
(e.g.,
eczema) •
Areas of
skin
breakdown
or damage
producing
uneven
heat
conduction
across the
skin •
Reprod-
uctive
organs
(testes)



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PAMS (cont)			PAMS (cont)			PAMS (cont)			PAMS (cont)		
paraffin	useful for	if patient	transc-	Stimulates	Pregnancy	ultrasound	Penetrates	Pacemaker	whirlpool	Pain	Fever
	contra-	has open	uta-	nerve	Pacemakers		deep into	• Areas of		management	Recent
	ctures due	wounds,	neous	fibers and	• Prone to		the	decreased		• Wound	skin gra
	to	abrasions	electrical	provides	seizures-		muscul-	circulation •		manage-	• Circul
	rheumatoid	or skin	nerve	sympto-	Tens		ature and	Impaired		ment, partic-	atory
	arthritis,	infect-	stimul-	matic	“pulses”		joint	sensation •		ularly in the	impaired
	burns, and	ions.	ation -	relief of	have the		tissues. •	Pregnancy		management	• Active
	progre-		TENS -	pain.	ppotential to		Increase	• Along the		of burn	bleedin
	ssive		used for	Used to	trigger a		the	cervical		patients • To	hemorrh
	systemic		PAIN	treat	seizure.		extens-	sympat-		facilitate	haging
	sclerosis			chronic			ibility of	hetic		debridement	Open
	(sclerode-			pain			collagen	ganglion		in infected	wounds
	rma). Used			syndrome,			fibers in	(or over the		wounds,	Sensor
	to treat			spinal			tendons	antero-		non-draining	vascula
	chronic			radiculop-			and joint	lateral		wounds,	impaired
	arthritis of			athy, low			capsules •	neck) •		wounds with	
	the hand,			back pain,			Reduce	Directly		thick eschar,	
	various			reflex			muscle	over the		and on	
	distal			sympat-			spasms •	spinal		wounds with	
	extremity			hetic			Aids tissue	column		loosely	
	conditions			dystrophy,			healing –	after		adherent	
	to increase			etc.			speeds up	lamine-		necrotic	
	ROM,						the rate of	ctomy •		tissue •	
	manages						healing &	Severe		Helps	
	pain, and						enhance	arterial		dressings to	
	assists in						the quality	disease or		be removed	
	wound						of the	DVT •		slowly and	
	healing.						repair •	Bleeding		gently,	
							Modulate	disorders •		reducing the	
							pain, goes	Over a		pain of	
							to the	bony		dressings	
							deepest	prominence		changes. •	
							layer for	• Over		ROM	
							pain	epiphyseal		exercises •	
								plates •		Promoting	
								Any		muscular	
								surgically		relaxation	
								implanted			
								artificial			
								product			
								(e.g.,			
								Gortex or			
								mesh) may			
								build up			
								heat in an			
								area.			

PAMS (cont)

contrast	Hot/cold	Same
baths	immersion	as
	therapy is a	Superf
	method of	icial
	treating: •	Heat
	Muscle	and
	soreness •	Cold
	Swelling •	
	Inflam-	
	mation. •	
	Joint	
	injuries, mild	
	sprains, •	
	Symptoms	
	of chronic	
	pain and	
	repetitive	
	strain	
	injuries •	
	Edema	



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